

PATENT

Atty. Dkt. No. ATT/2000-0518

**IN THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. -2. (Canceled)

3. (Currently amended) ~~The method according to claim 4~~ A method for monitoring a packet transmission path between in a network to determine conversational voice quality of Voice-over-Packet transmissions across said path, comprising the steps of:  
injecting at least one probe packet for transport across the transmission path;  
measuring packet delay and packet loss for said probe packet across said path;  
establishing an analytic value for voice quality impairment due to delay in accordance with measured packet delay;  
establishing an analytic value for voice quality impairment due to said network in accordance with packet loss;  
deriving a measure of overall conversational voice quality associated with the transmission path in accordance with the algebraic sum of the analytic values for voice quality impairment due to delay and voice quality impairment due to loss in said network; and  
 wherein the analytic value for voice quality impairment due to delay ( $I_d$ ) is obtained in accordance with the relationship:

$$I_d = b_1 d + b_2 (d - b_3) H(d - b_3)$$

where  $b_1 = 0.024/\text{ms}$ ,  $b_2 = 0.11/\text{ms}$  and  $b_3 = 177.3 \text{ ms}$ ,  $d$  is the measured delay and  $H(x)$  is the Heavyside function.

4. (Currently Amended) ~~The method according to claim 1~~ A method for monitoring a packet transmission path between in a network to determine conversational voice quality of Voice-over-Packet transmissions across said path, comprising the steps of:  
injecting at least one probe packet for transport across the transmission path;

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measuring packet delay and packet loss for said probe packet across said path;  
establishing an analytic value for voice quality impairment due to delay in  
accordance with measured packet delay;  
establishing an analytic value for voice quality impairment due to said network in  
accordance with packet loss;  
deriving a measure of overall conversational voice quality associated with the  
transmission path in accordance with the algebraic sum of the analytic values for voice  
quality impairment due to delay and voice quality impairment due to loss in said  
network; and

wherein the analytic value for voice quality impairment due to said network ( $I_{ef}$ ) is obtained in accordance with the relationship:

$$I_{ef} \cong g_1 + g_2 \ln(1 + g_3 e)$$

where:

$g_1$ ,  $g_2$  and  $g_3$  are parameters of curve fitting and  $e$  is the measured packet loss.

5. (Original) The method according to claim 3 wherein the analytic value for voice quality impairment due to said network ( $I_{ef}$ ) is obtained in accordance with the relationship:

$$I_{ef} \cong g_1 + g_2 \ln(1 + g_3 e)$$

where:

$g_1$ ,  $g_2$  and  $g_3$  are parameters of curve fitting and  $e$  is the measured packet loss.

6. (Original) The method according to claim 5 wherein the overall measure of conversational voice quality ( $R$ ) associated with the transmission path is given by the relationship:

$$R \sim 94.2 - b_1 d - b_2(d - b_3)H(d - b_3) - g_1 + g_2 \ln(1 + g_3 e)$$

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7. (Canceled).

8. (Currently amended) ~~The system according to claim 7~~ A system for measuring monitoring a packet transmission path between in a network to determine conversational voice quality of Voice-over-Packet transmission across said path, said system including a processor connected to the network, the processor monitoring the voice quality by performing the steps of:

injecting at least one probe packet for transport across the transmission path;

measuring packet delay and packet loss for said probe packet across said path;

establishing an analytic value for voice quality impairment due to delay in

accordance with measured packet delay;

establishing an analytic value for voice quality impairment due to said network in

accordance with packet loss; and

deriving a measure of overall conversational voice quality associated with the transmission path in accordance with the algebraic sum of the analytic values for voice quality impairment due to delay and voice quality impairment due to loss in said network; and

wherein the processor establishes the analytic value for voice quality impairment due to delay ( $I_d$ ) in accordance with the relationship:

$$I_d = b_1 d + b_2 (d - b_3) H(d - b_3)$$

where  $b_1 = 0.024/\text{ms}$ ,  $b_2 = 0.11/\text{ms}$  and  $b_3 = 177.3 \text{ ms}$ ,  $d$  is the measured delay and  $H(x)$  is the Heavyside function.

9. (Original) The method according to claim 8 wherein the processor establishes the analytic value for voice quality impairment due to said network ( $I_{ef}$ ) is obtained in accordance with the relationship:

$$I_{ef} \cong g_1 + g_2 \ln(1 + g_3 e)$$

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where:

$g_1$ ,  $g_2$  and  $g_3$  are parameters of curve fitting and  $e$  is the measured packet loss.

10. (Original) The method according to claim 9 wherein the processor obtains an overall measure of conversational voice quality (R) associated with the transmission in accordance with the relationship:

$$R \sim 94.2 - b_1 d - b_2(d - b_3)H(d - b_3) - g_1 + g_2 \ln(1 + g_3 e).$$